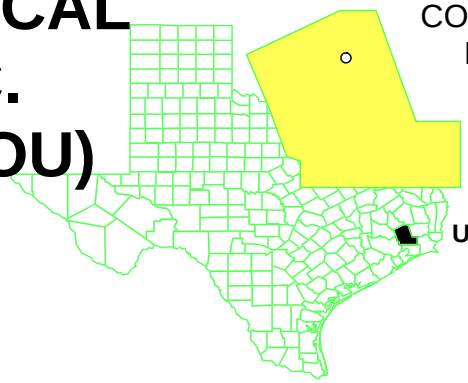
PETRO-CHEMICAL SYSTEMS, INC. (TURTLE BAYOU)

TEXAS

EPA ID# TXD980873350
Site ID: 0602957



EPA REGION 6
CONGRESSIONAL DISTRICT 02
Liberty County

Other Names:
Turtle Bayou

Updated: 05/19/04

Site Description

Location:
- The site is located on Frontier Park Road, south of Liberty (east of Houston and FM 563; 7 miles north of I-10), Liberty County, Texas.
- Frontier Park Road transverses the site.

Population:
- A small business and 21 residences are within a one-mile radius of the site along FM 563 and Frontier Park Road.

Setting:
- The nearest residence and drinking water well are on-site.
- Of the 500+acre tract, 5 disposal areas have been identified.
- Contaminated waste oils were used as dust control along Frontier Park Road.
- Areas identified on the site include the main waste area, temporary office area, power line easement area, bayou disposal area, and under a section of the road on the west road area and CR 126 (formerly Frontier park Road) which traverses the site.

Hydrology:
- The site is characterized by recent alluvial deposits which overlay Texas Coastal Plain deposits.
- The water table is at 18 to 25 feet below the surface of the site.
- The east end of the site falls within the 100-year flood plain, along the Turtle Bayou tributary.

Wastes and Volumes

- The principal pollutants at the site, by areas of concern, are:

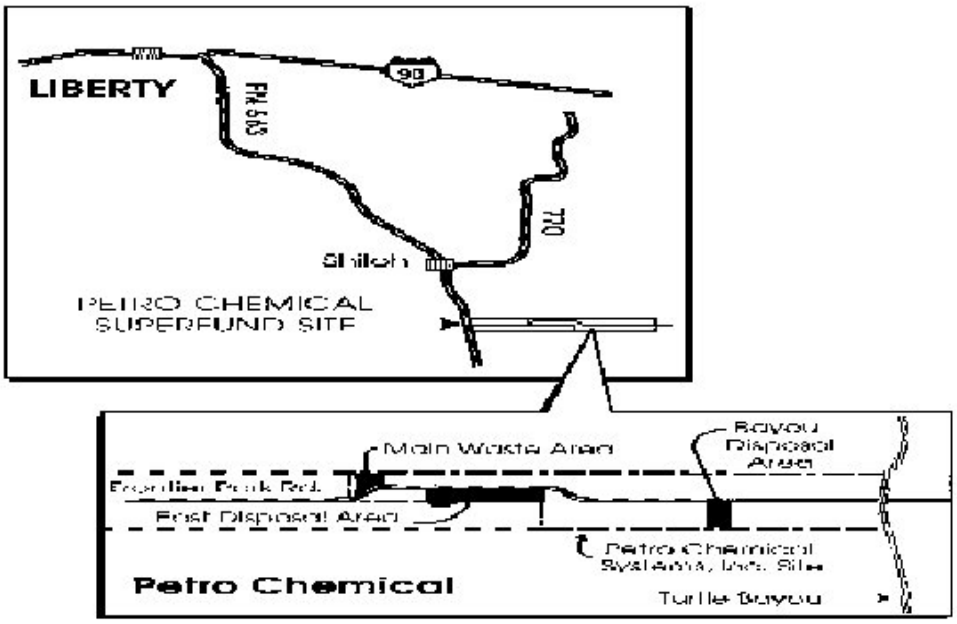
Road:	o Naphthalene	1100 ppm soil composite
	o Chrysene	8 ppm
	o Fluorene	200 ppm
	o Benzene	2000 ppm
Surface Soil:	o Benzene	Up to 7,000 ppm
	o Naphthalene	Up to 6,700 ppm
	o Lead	Up to 5,000 ppm
Groundwater:	o Naphthalene	13,000 ppm
	o Styrene	660 ppm
	o Benzene	480 ppm

- Waste volumes at the site include approximately 5,900 cubic yards in the road area, and 300,000 cubic yards in the remainder of the site.

Site Assessment and Ranking

NPL LISTING HISTORY
Site HRS Score: 29.94
Proposed Date: 10/15/84
Final Date: 5/20/86
NPL Update: No. 2

Site Map and Diagram



The Remediation Process

Site History:

- Site operations commenced prior to 1970, and continued until the late 1970s. Waste oils were dumped on Frontier Park Road and into unlined waste pits along road.
- A conditional commercial permit was issued 1971, but was revoked due to legal action and withdrawn 1974.
- After 1974, the land was developed and subdivided into residential properties.
- In 1986, EPA installed a fence and conducted site sampling.
- In 1988, Frontier Park Road was excavated, back-filled, and re-built; residents were relocated during this period.
- The Remedial Investigations and Feasibility Studies (RI/FS) for both Frontier Park Road (FPR) and Source Control phases (or operable units), were initiated in April 1988.
- The Texas Natural Resource Conservation Commission (TNRCC) is the lead agency on cleanup of the FPR phase, while EPA has the lead on the Source Control.

Health Considerations:

- Ground water contamination has been detected.

- The Agency for Toxic Substances and Disease Registry (ATSDR) has indicated that no immediate health threat is posed.

- All areas of apparent waste disposal have been identified.

Other Environmental Risks:

- Numerous shallow wells, approximately 25 ft. deep, are a current source of drinking water for the rural area.

- However, all wells currently used on the site are screened in the deeper aquifer at a depth of approximately 100 feet.

Record of Decision

Signed: March 27, 1987 (FPR)
Signed: September 6, 1991
(Source)
ROD Amendment: April 30, 1998
(Source & Ground Water)

Frontier Park Road (FPR):

- The Record of Decision (ROD) for Frontier Park Road called for excavation of soil on and around the road followed by placement of the contaminated soil within a temporary on-site RCRA storage facility with temporary relocation of residents.
- This remedy includes mowing of the vault and road area, visual inspections, and disposal of leachate.

Source Control:

- The Source Control ROD selected soil vapor extraction and catalytic oxidation of organic contamination, and includes cap and slurry walls around waste disposal areas. To address ground water contamination, soil sparging with extraction and treatment of contaminated vapors was identified. As a result of extensive field pilot study activities conducted during the remedial design, additional soil and ground water remedy enhancements have been identified. These include in-situ bioremediation of contaminated ground water. To more effectively address soil contamination, the following remedial enhancements were identified: thermal desorption, bioventing, excavation and treatment and/or offsite disposal of site “hot spots”, etc. In 1998, the EPA amended the 1991 ROD to include these and other remedial approaches.

Other Remedies Considered		Reason Not Chosen
	FPR	
1.	"No Action"	Road needs action, too great a threat
2.	Onsite storage with temporary detours	More costly than relocation
3.	Off-site disposal with relocation of residents	Not cost-effective; transportation risks
4.	Off-site disposal with temporary detours	Not cost-effective; transportation risks
5.	Alternative access, Fence contaminated areas	Does not eliminate threat from road
6.	Removal to background levels, temporary detours	Not cost-effective
7.	Surface barrier, temporary detours	Does not alleviate threat from road
	Source Control	
1.	"No Action"	Not protective of human health and the environment
2.	Cap and Slurry Wall	Part of selected remedy
3.	Biological treatment	Short Term Impacts
4.	Solvent extraction	Short Term Impacts
5.	Thermal destruction	Not cost-effective
6.	Thermal stripping	Short Term Impacts
7.	On-site landfill disposal	Short Term Impacts
8.	Offsite landfill disposal	Short Term Impacts
9.	Soil vapor extraction and catalytic oxidation	Part of selected remedy
10.	Ground water extraction (wells), carbon adsorption or direct disposal	May be used, based on pilot study results
11.	Ground water extraction by recovery trenches; carbon adsorption or direct disposal.	May be used, based on pilot study results
12.	Combination of treatment technologies results to address various areas of site.	May be used, based on pilot study

- An Inter-agency agreement was signed with Federal Emergency Management Agency to relocate residents during work on FPR.

ROD Amendment:

This ROD Amendment addressed a modification to the soil cleanup criteria for benzene identified in the September 6, 1991 ROD. The 1991 ROD's benzene soil cleanup criteria was based on numerical model predictions of the allowable benzene concentrations in soils that, when attained, would not result in exceeding the federal drinking water standards in the underlying shallow aquifer via leaching. The benzene soil cleanup criteria modification is based on the following:

- rerunning the numerical model using site specific data (e.g., soil moisture profiles, field permeability test results) collected during the field pilot study activities; and

- consideration of the Texas Natural Resource Conservation Commission's residential exposure standard for benzene in soil from zero to two feet below ground surface.

All other 1991 ROD performance standards, including the benzene ground water cleanup criteria, remained unchanged.

This ROD Amendment addressed the remedy for the site's contaminated soils and contaminated ground water. The remedy for the soil contamination addresses the principal threats (i.e., areas of the site where soil is known or suspected to contain high concentrations of dissolved and/or free non-aqueous phase liquid) as well as low level threats at the site by minimizing potential exposure by way of ingestion, inhalation or direct contact with contaminants and by reducing the potential for the contaminated soil to act as a continued source for ground water contamination. The remedy for the ground water contamination addresses the principal risk at the site by minimizing potential exposure by way of direct contact and ingestion with contaminants and by eliminating the potential for migration of contaminants to deeper ground water zones.

This ROD Amendment enhanced the site's remedy by identifying additional soil and ground water remedy components which can be used in combination with 1991 ROD remedy components to achieve the site's performance standards in compliance with all Federal, state and local applicable or appropriate requirements. The identification of the additional remedy components used to achieve the site performance standards is based upon further site characterization, results of field pilot studies, and the ongoing operation of the pilot systems. The additional soil and ground water remedy components include:

- in-situ aquifer bioremediation;
- bioventing;
- aqueous phase soil bioremediation;
- soil excavation and off-site treatment and/or disposal;
- soil excavation and biotreatment;
- thermal desorption;
- soil washing;
- containment (e.g., living cap);
- monitored natural attenuation; and
- institutional controls.

Remedy components identified in the 1991 ROD include:

- soil vapor extraction;
- containment (e.g., traditional synthetic liner cap);
- selected directional containment (e.g., slurry wall);
- installation of storm water management controls;
- monitoring ground water; and
- the restoration of the site surface upon completion of the remedial action.

The primary remedy treatment components addressing site contamination are soil vapor extraction and in-situ aquifer bioremediation. The field pilot studies have shown that a flexible approach is an effective means of addressing the varying geologic conditions at the site and area specific problems. It is anticipated that to attain the performance standards, the use of the various

remedy components in succession will be required. The use of multiple remedy components maximizes the efficiency of remedial operations: over time, treatment technologies such as soil vapor extraction become less effective in removing contamination, at which point it is more efficient to change to another, more passive, technology (e.g., bioventing). The transition from one remedy component (e.g., soil vapor extraction) to a subsequent remedy component (e.g., bioventing) will generally be determined by progress sampling. In general, benzene will be the main chemical of concern; the levels of benzene will be measured over time; a significant decrease in the time rate removal of benzene will indicate a remedy component change. The ROD Amendment describes in more detail the use of various technologies in different areas of the site.

Within this ROD Amendment, EPA narrowed the site boundary from approximately 500 acres to include only the contaminated portions of property (and all suitable property in very close proximity to the contamination necessary for implementation of the remedial design and remedial action). This narrowing of the site boundary is based upon several years of field investigations and contamination data which has been gathered since the site boundary was originally defined.

Community Involvement

- Community Involvement Plan: Developed 8/85, revised 11/89
- Open houses and workshops: 12/84, 11/85, 3/89, 4/91, 6/91, 2/96, 7/00, 11/00
- Proposed Plan Fact Sheet and Public Meeting: 11/86 (FPR), 6/91 (Source),
- ROD Fact Sheet: 3/87 (FPR), 9/91 (Source)
- Milestone Fact Sheets: 10/86, 7/87, 12/87, 7/88, 1/89, 11/90 (TWC), 05/91, 08/95, 09/99
- Proposed ROD Amendment fact sheet (10/97) and public meeting (11/97):
- Citizens on site mailing list: 80
- Constituency Interest: Site-area residents are concerned about site contamination, property values, and maintenance of Frontier Park Road.
- Site Repository: Liberty Municipal Library, 1710 Sam Houston Avenue, Liberty, TX 77575

Technical Assistance Grant

- Letters of Intent Received: None
- Grant Award: N/A
- Current Status: No apparent citizen interest in applying for the grant.

Contacts

- **Remedial Project Manager:** Chris Villarreal, (214)665-6758, Mail Code: 6SF-AP
- **EPA Regional Public Liaison:** Arnold Ondarza; 303-312-6777
- **State Contact:** (TNRCC) Luda Voskov, 512/239-6368
- **Attorney:** Anne Foster, (214) 665-2169
- **State Coordinator (EPA):** Karen Bond, (214) 665-6682, Mail Code: 6SF-AP
- **Prime Contractors:** Lockwood, Andrews & Newmann (Source RI/FS, FPR O&M)
  CH2M HILL (Road RD/RA)
  Fluor Daniel (Source - RD Technical Assistance)
  Tetra Tech (Bayou Disposal Area - Fund Lead work)
  Tetra Tech (Remedial Action Oversight)

Enforcement

- During the course of the original RI/FS, a supplemental RI/FS was conducted by ARCO under an Administrative Order on Consent signed 3/6/91.
- In May, 1993, Special Notice Letters were sent to eight parties to conduct the RI/FS.
- After a failed attempt to negotiate a Consent Decree with site PRPs, a Unilateral Administrative Order (UAO) was issued to Potentially Responsible Parties (PRPs) in December 1993. ARCO Chemical Company and Atlantic Richfield Company are the only PRPs currently implementing work required by UAO.
- A Consent Decree between EPA and Lyondell (formerly ARCO Chemical) and Atlantic Richfield has been entered with the Eastern District Court of Texas by the Department of Justice. The Consent Decree was lodged by the court on December 8, 1998.

Present Status and Issues

- With the cleanup actions described above, the EPA has greatly reduced the potential for accidental contact or exposure to contaminated soil and dust along Frontier Park Road while cleanup actions are being designed.
- The remedial action is currently underway at the site. Soil vapor extraction, thermal desorption, and in-situ brioremediation technologies are the primary cleanup technologies being implemented. Active remediation activities are scheduled for completion by December 2004.
- Eight rounds of ground water sampling conducted in the Bayou Disposal Area have been completed. The data collected from this effort is currently under review. Construction of the living cap is on hold.
- A new source area was identified at the far west end of the site near FM 563. A ground water plume containing elevated levels of chlorinated compounds (e.g., vinyl chloride) and benzene has been identified. Remedial alternatives for this new area are currently being identified and evaluated.
- To the extent practicable, local goods and services are being used for the project. For example, the on-site security personnel are from the local community.
- The October 2000 Five-Year Review of the site found that the remedial actions performed are functioning as designed and the site is being maintained appropriately. Institutional controls such as deed restrictions and community notification for construction excavation and well installation in the site area need to be addressed to ensure future protectiveness. The County Road 126 West area will be evaluated and actions taken to address this area's contamination. Additional information will be collected and evaluated regarding local community concerns.

Benefits

- Residents in 21 homes and business clientele in the site area are now safe from direct contact and dust inhalation of Frontier Park Road wastes.
- Remedial activities are cleaning the site to residential cleanup standards so as to be fully protective for those living on the site now or in the future.
- Ongoing remedial activities have provided jobs to the local community (i.e., security).